WHAT IS CLAIMED IS:

1. A method of controllably inducing nucleation of a first solute dissolved in a solution comprising

(a) providing a primary vessel for containing said solution;

(b) applying an induction potential to said primary vessel such that said solution acquires a net charge; and

(c) causing ion-induced nucleation of at least some of said first solute in a condensed phase.

2. The method as defined in claim 1, wherein said step of causing ion-induced nucleation comprises maintaining the surface charge density of said primary vessel above a threshold value.

3. The method as defined in claim 1, wherein causing ion-induced nucleation comprises adjusting the surface charge density of said primary vessel.

4. The method as defined in any one of the preceding claims, wherein ions in said vessel in excess of any counterions induce heterogeneous nucleation of said solute.

5. The method as defined in claim 1, wherein said primary vessel is wall-less.

6. The method as defined in any one of the preceding claims, wherein said primary vessel is a droplet.

7. The method as define in claim 6, wherein said droplet is levitated after application of said induction potential.

8. The method as defined in claim 7, wherein said droplet is levitated in a levitation device selected from the group consisting of an electrodynamic balance, an acoustic balance, an electrostatic balance, a magnetic balance, a radiation pressure device or any combination thereof.

9. The method as defined in claim 1, wherein said ion-induced nucleation causes formation of one or more nuclei and wherein said method further comprises delivering said nuclei to a target location.

10. The method as defined in claim 9, wherein said target location is a substrate.

11. The method as defined in claim 10, wherein said primary vessel is a droplet levitated in a levitation device and wherein said target location is located at a position remote from said levitation device.

12 The method as defined in claim 10, wherein at least a portion of said solution comprising said nuclei is deposited on said substrate.

13. The method as defined in claim 9, wherein at least some of said nuclei are delivered from said primary vessel to a secondary vessel.

14. The method as defined in claim 13, wherein said at least some of said nuclei seed crystal growth in said secondary vessel.

15. The method as defined in any one of the preceding claims, wherein said solution initially comprises at least one volatile solvent, and wherein said solvent evaporates from said vessel causing an increase in concentration of said first solute.

16. The method as defined in claim any one of the preceding claims, herein volatile solvents in said solution are allowed to evaporate to yield a residue comprising said one or more nuclei.

17. The method as defined in claim, wherein said ions causing said heterogeneous nucleation are located in an outer layer of said vessel.

18. The method as defined in claim 6 , wherein said solution comprises a surface tension modifier to inhibit Coulomb explosion of said droplet.

19. The method as defined in claim 9, wherein at least some of said nuclei are used to promote crystallization of said first solute.

20. The method as defined in claim 1, wherein said first solute is a solid.

21. The method as defined in claim 1, wherein said first solute is selected from the group consisting of inorganic compounds and organic compounds.

22. The method as defined in claim 1, wherein said first solute is a melt.

23. The method as defined in claim 22, wherein said first solute is a biomolecule.

24. The method as defined in claim 23, wherein said biomolecule is a protein.

25. The method as defined in claim 22, wherein said first solute is an organic acid.

26. The method as defined in claim 22, wherein said organic compound is selected from the group consisting of CHCA and THAP.

27. The method as defined in claim 1, wherein a second solute is dissolved in said solution in addition to said first solute.

28. The method as defined in claim 26, wherein said first solute and said second solute are selected from the group consisting of organic compounds and inorganic compounds.

29. The method as defined in claim 27, comprising selectively precipitating at least one said first and second solutes.

30. The method as defined in claim 29, comprising separating one said first and second solutes from the other of said first and second solutes by selectively causing crystallization of one of said solutes.

31. The method as defined in claim 28, wherein said first and second solutes are stereoisomers.

32. The method as defined in claim 28, wherein said first and second solutes are enantiomers.

33. The method as defined in claim 28, wherein said method results in co-crystallization of said first and second solutes.

34. The method as defined in claim 33, wherein said second solute is a MALDI matrix.

35. The method as defined in claim any of the preceding claims wherein said method is adapted for selectively separating polymorphic forms of said first solute.

36. The method as defined in claim 1, wherein said primary vessel comprises a portion of a conduit holding said solution.

37. The method as defined in claim 36, wherein said conduit is a capillary.

38. The method as defined in claim 27, wherein said method causes differential precipitation of said first and second solutes.

39. The method as defined in claim 1, further comprising adding a solid to said solution to further induce nucleation of said first solute.

40. The method as defined in claim 1, optimizing the ionic make-up of said solution prior to applying said induction potential.

41. A precipate or co-precipitate produced by any one of the preceding claims.

42. A method of controllably inducing precipitation of selected solutes dissolved in a solution comprising

(a) providing a primary vessel for containing said solution;

(b) applying an induction potential to said primary vessel such that said solution acquires a net charge; and

(c) selectively causing ion-induced precipitation of at least one of said solutes in a condensed phase.

43. The method as defined in claim 42, wherein said step of selectively causing ion-induced precipitation comprises adjusting the mass-to-charge ratio of said primary vessel.

44. The method as defined in claim 42, wherein said step of selectively causing ion-induced precipitation comprises increasing the surface charge density of said vessel.

45. The method as defined in claim 44, wherein said primary vessel is a droplet and said surface charge density is increased at an outer air-droplet interface thereof.

46. A method of controllably inducing crystallization of at least one solute dissolved in a solution, said method comprising

(a) providing a primary vessel comprising said solution;

(b) controllably imparting a net charge on said solution in a condensed phase to selectively cause ion-induced nucleation of said at least one solute; and

(c) depositing crystals derived from said nucleation on a substrate.

47. The method as defined in claim 46, wherein said crystals are deposited on said substrate at a predetermined target location.

48. The method as defined in claim 46, further comprising identifying the structure of said crystals on said substrate.

49. The method as defined in claim 46, further comprising producing said solute on said substrate in a purified solid form.

50. The method as defined in any one of claims 46 - 48, wherein said depositing and said identifying are automated.

51. The method as defined in claim 46, wherein said solution comprises a mixture of solutes dissolved in said solution and wherein steps (a) - (c) are performed in respect

of each of a plurality of said solutes to thereby selectively separate and characterize said solutes.

52. The method as defined in claim 51, wherein said solutes comprise biomolecules.

53. The method as defined in claim 51, wherein said solutes comprise stereoisomers.

54. The method as defined in claim 51, wherein said solutes comprise a mixture of organic and inorganic compounds.

55. The method as defined in claim 51, wherein said solutes are selected from the group consisting of metals, alloys and melts

56. The method as defined in claim 51, wherein at least one of said solutes is a MALDI matrix.

57. The method as defined in claim 51, wherein as least one of said solutes is a polymorph.